

CLAIMS

1. A method of analyzing the performance of a modem connection, comprising:
connecting a line interface to a communication link carrying signals of a modem connection, between a pair of end modems;
collecting signals passing on the communication link, between the end modems, through the line interface;
determining quality or transmission characteristics regarding the modem connection, responsive to signals collected through the line interface; and
displaying information on the determined characteristics.
2. A method according to claim 1, wherein the modem connection comprises a full-duplex modem connection.
3. A method according to claim 1 or claim 2, wherein the modem connection comprises an ADSL modem connection.
4. A method according to any of the preceding claims, wherein connecting the line interface to the communication line comprises connecting at a point at least two times closer to one of the modems than the other modem.
5. A method according to any of the preceding claims, wherein connecting the line interface to the communication line comprises connecting at a point at most two times closer to one of the modems than to the other modem.
6. A method according to any of the preceding claims, wherein collecting signals passing on the communication link comprises collecting without sending to either of the modems acknowledgment signals or any other modem tangible signals.
7. A method according to any of the preceding claims, wherein displaying information on the determined characteristics comprises displaying the contents of one or more modem negotiation signals.

8. A method according to any of the preceding claims, wherein displaying information on the determined characteristics comprises providing information on noise levels on the connection.
9. A method according to claim 8, wherein providing information on noise levels on the connection comprises suggesting possible sources of the noise.
10. A method according to claim 8 or claim 9, wherein displaying information on the determined characteristics comprises providing information on effects in upper physical layers caused by the noise levels on the connection.
11. A method according to claim 1, wherein displaying information on the determined characteristics comprises providing information on the symbol mapping used by the connection.
12. A method according to any of the preceding claims, wherein displaying information on the determined characteristics comprises displaying information on signaling signals transmitted in parallel to data transmission.
13. A method according to any of the preceding claims, comprising performing signal tests on test signals transmitted on the connection and comparing the results of the tests to negotiation signals reporting test results from one of the modems.
14. A method according to any of the preceding claims, comprising injecting by the performance analyzer noise which forces a retrain of the modem connection.
15. A method according to claim 14, wherein injecting the noise comprises injecting noise in a manner which does not substantially interfere with a different connection passing on the communication link.
16. A method according to claim 14 or claim 15, wherein injecting the noise comprises connecting a low impedance circuit, for at least some of the frequency bands carrying signals, to the communication link.

17. A method according to any of claims 14-16, wherein the modem connection comprises a DSL connection.
18. A method according to claim 17, wherein the injected noise does not interfere with voice frequency bands of the communication link.
19. A method according to any of the preceding claims, wherein the modem connection comprises a voice band modem connection.
20. A method according to any of the preceding claims, comprising identifying changes in the operation of the modem connection and providing suggested causes of the changes.
21. A method according to claim 20, wherein identifying changes comprises identifying a retrain.
22. A method according to claim 20 or claim 21, wherein identifying changes comprises identifying a bit swap.
23. A method according to any of claims 20-22, wherein providing suggested causes of the changes comprises identifying, for at least one change, a noise that caused the change.
24. A method according to any of the preceding claims, comprising identifying data retransmissions and providing suggested causes of the data retransmissions.
25. A method according to any of the preceding claims, wherein displaying information on the determined characteristics comprises displaying a raw bit content of signals transmitted on the modem connection.
26. A method according to any of the preceding claims, wherein displaying information on the determined characteristics comprises providing a warning on a possible tapping of the communication link.

27. A method according to any of the preceding claims, comprising extracting the data transmitted on the modem connection.
28. A modem connection performance analyzer, comprising:
a line interface adapted to collect signals of a modem connection passing on a communication link, between two end modems connected to the link;
a processor adapted to determine one or more quality or transmission characteristics regarding the modem connection, responsive to the collected signals; and
a human interface adapted to provide information on the determined characteristics.
29. A performance analyzer according to claim 28, comprising a low impedance shorting circuit adapted to short at least some of the frequencies of the communication link, responsive to a command from the processor.
30. A method of monitoring an xDSL modem connection, comprising:
connecting a line interface to a communication link carrying signals of an xDSL modem connection, between a pair of end modems separate from the line interface;
collecting signals passing between the end modems on the communication link, through the line interface; and
providing information on the modem connection, responsive to the collected signals.
31. A method according to claim 30, wherein providing information on the modem connection comprises providing information on the operation of the connection.
32. A method according to claim 30 or claim 31, wherein providing information on the operation of the modem connection comprises providing data passing on the connection.
33. A method of forcing a retrain on a modem connection, comprising:
determining at least one first frequency band to be disrupted; and
connecting to a communication line carrying the modem connection, between two end modems, a circuit which disrupts transmission of signals on the at least one first frequency band.

34. A method according to claim 33, wherein determining the at least one first frequency band to be disrupted comprises determining a frequency band including a pilot tone frequency band of the modem connection.
35. A method according to claim 33 or claim 34, wherein the circuit disrupts the first frequency band substantially without interfering with signals of a second frequency band.
36. A method according to claim 35, wherein the second frequency band comprises a frequency band of voice signals.
37. A method according to claim 35 or claim 36, wherein connecting the disruption circuit comprises connecting a circuit which shorts the at least one first frequency band without shorting the second frequency band.
38. A method according to any of claims 33-37, wherein connecting the disruption circuit comprises connecting a circuit which injects noise at the at least one first frequency band.